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ABSTRACT

The research presented in this paper demonstrates that Katz and Kahn's (1966) distinction between people-processing and object-processing organizations is a useful classification scheme that can help explain differences in organizational communication systems. To assess the usefulness of Katz and Kahn's scheme, data derived from a sample of more than 4,000 organizations in Wisconsin were analyzed to determine whether the structure and function of communication systems used by people-processing and object-processing organizations vary systematically. The analysis focused on variances in measures of the structure and function of the water-use (task-oriented) communication systems used by these different types of organizations. The research findings support the proposition that an organization's through-put will significantly influence the structure and function of the organization's task-oriented communication system. Object-processing organizations in this study scored significantly higher on the data acquisition index than people-processing organizations. Also, the evidence indicates that object-processing organizations place much more emphasis on data transportation than do people-processing organizations, probably due to the immediate demands of the marketplace. (LL)

# A COMPARATIVE ANALYSIS: THE STRUCTURE AND FUNCTION OF TASK-ORIENTED COMMUNICATION WITHIN COMPLEX ORGANIZATIONS

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## INTRODUCTION

Talk with most corporate communicators, public relations practitioners, and others intimately involved in organizational communication, and often you will hear them speak of their job as if it were unique. Some people think because communication is such an art and because no two organizations are quite the same, that any communication process used by any one organization will be special. While it may well be true that communication is much more of an art than a science, there is a growing body of theoretical and empirical evidence to indicate that the structure and function of public relations, corporate communication--however organizational communication is described--can be predicted given the general type of organization supporting the communication system.

Recently the Wisconsin Department of Natural Resources (DNR) wanted to know how various organizations used data relating to the state's water resources. Data about water is an important piece of task-oriented information for a variety of organizations. DNR water resource planners and management information specialists wanted to identify generic characteristics of the communication systems used by various Wisconsin organizations which gathered, processed, stored and consumed water-use data. They conducted a number of mail and telephone surveys to get this information, and the data from the DNR surveys has now been re-analyzed in accordance with current theories of communication processes within complex organizations.* The findings have implications for both researchers and practitioners of organizational communication.

## THE THEORY

To identify generic characteristics, DNR survey researchers used a multi-systems approach to organizational communications. As Grunig (1974) would explain: "explanatory concepts (were) applied to communication behavior at several system levels and between different systems." Grunig's perspective, which this paper uses, assumes that a theory of organizational communication...

*The author was principal investigator for the surveys conducted by the Wisconsin Department of Natural Resources. The research was funded by the U.S. Geological Survey.

"...will explain organizational communication as one aspect of organizational behavior. Communication will not be conceptualized as a natural process which occurs according to natural laws, but as an artificial procedure which individuals and systems design to bridge gaps in the system (Carter, 1973; Simon, 1969). Communication will be viewed as behavior which systems use to reduce uncertainty and to deal with problematic situations. (Grunig, 1966)." (Grunig, 1974: 3)

The DNR data allows an assessment of a model of organizational communication developed by Lee Thayer (1968). He conceptualized organizational communication as being composed of four basic processes: data acquisition, data transportation, data processing, and data display. According to Thayer:

"Essentially what gets organized when people organize themselves into collective enterprises of one sort or another (companies, nations, etc.) is the flow of enterprise-related information (both into and out of decision points), and hence the strategic relationships between and among the working parts of those organizations. What is at stake is this: Who does what with what pieces of enterprise-related information?...It is the communication that occurs and the patterns of intercommunication which ensue that define and determine the structure and functioning of any organization." (Thayer, 1968: 18)

In addition to describing the arrangement of activities constituting the communication process, Thayer describes certain performance characteristics of the communication process: he mentions concepts such as adequacy, adaptability, reliability, and compatibility, while acknowledging that these concepts are not the only ones which can describe the performance or "efficacy" of the communication system. By identifying these two domains of variables--properties of social arrangements and properties of social performance--Thayer has employed a structural-functional approach to organizational communication.

Structural-functionalism focuses on the components of a system. Functions are measures of performance, and structural variables emphasize relationships and arrangements. Hage states: "Structural-functional analysis in sociology can be defined as relating variables of social arrangement and variables of social performance" (Hage, 1974b).

The analysis presented in this paper is based on structural-functionalism. The analysis assumes that organizations can be classified a priori into useful typologies, and that the basic nature of an organization--its major role in society--significantly influences its behavior. The proposition investigated with the secondary analysis of the DNR data is that an organization's "through-put" influences the structure and function of the organization's task-oriented communication processes.

A number of different organizational typologies have been developed and investigated (Parsons, 1969; ~~Etzioni, 1961~~; Blau and Scott, 1962; Burns, 1967; Hall, 1972; Hall, Haas, Johnson, 1966, 1967). Katz and Kahn (1966) identified "genotypic" functions (production or economic, maintenance, adaptive, managerial or political) and what they called "second order characteristics" or basic dimensions which can differentiate many types of organizations. They discussed four of these basic dimensions: the nature of the organization's through-put, the processes for insuring the maintenance input of human personnel, the nature of the bureaucratic structure, and the type of equilibrium of the system.

The research presented in this paper demonstrates that Katz and Kahn's distinction between people-processing and object-processing organizations is a useful classification scheme that can help explain differences in organizational communication systems.

"Two basic differences must be recognized in dealing with systems processing social objects as against physical objects," Katz and Kahn explained. First, in people-processing organizations, "the internal procedures must attract and motivate" those being processed. Second, the external transactions of people-processing organizations "are not those of the market place in any immediate or direct sense...Hence, the institution is less open to the immediate influence of the market place and most concerned with long-range outcomes."

## THE DESIGN AND METHODOLOGY

To assess the usefulness of Katz and Kahn's classification scheme, data derived from a sample of more than 4,000 organizations in Wisconsin were analyzed to determine whether the structure and function of communication systems used by people-processing and object-processing organizations vary systematically. A sample (N=531) of organizations judged by the Wisconsin Department of Natural Resources "to be potentially interested in water-use data" was initially surveyed by DNR to determine water-use data needs of these organizations.* A follow-up

*See: Wisconsin Dept. of Natural Resources "Final Report of the DNR-USGS water-use Project", Letter #8250; L.P. Voight, Secretary, Box 450, Madison, Wisconsin 53701.

telephone survey of the 74 respondents who expressed a high interest in "a coordinated water data program" focused on how these organizations use data about the state's water resources. A secondary analysis of these 74 respondents indicates significant differences in the structure and function of the communication process among the following types of organizations: manufacturers, state and federal bureaucracies, regional planning agencies, voluntary organizations, power generators, and city governments. DNR water resource specialists identified a priori more than 4,000 Wisconsin organizations which fit, in their judgment, these categories. The secondary analysis used the Katz and Kahn distinction of people-processing and object-processing through-put (see Figure 1). The analysis focused on variances in measures of the structure and function of the water-use (task-oriented) communication systems used by these different types of organizations.

## THE COMMUNICATION PROCESS

The following conceptual definitions of the components of task-oriented communication processes are derived from an explication by Lee Thayer (1968). Data acquisition, data transportation, data processing and data display are the four basic components.

Data acquisition is the process of collecting or gathering data which is used by the communication system. According to Thayer, "Whether the system is limited to a single individual or links thousands together in some collective effort, data for its user(s) must be acquired or collected or educed in some way. Data must be brought into the system at certain points, with certain selectivities, and on some sort or planned or fortuitious schedule." Data acquisition was operationally defined for the DNR study as the amount of time and energy put into frequently collecting reliable information. The following scales were used:

Where do you get most of this data?

1... We get the data from published sources of water-use data
2... Another organization gathers it for us and gives it to us in unpublished form.
3... Our organization gathers its own raw data
If your organization gathers its own raw data or if another organization gives you unpublished data, where does most of this data come from?
4... Voluntary reports from appropriate water users.
5... Engineering estimates (for instance, from the size of well casings or the type of pump).

6... Sampling procedures which are on-site or which yield directly sampled data.
7... Direct monitoring devices, such as meters.

How frequently is this data collected?

1... Annually
2... Quarterly
3... Monthly
4... Weekly
5... Daily
6... Hourly

Data transportation is the process by which data are sent to the appropriate organizational sub-unit(s) that process it. According to Thayer, "Once in the system, data must be transported, distributed, or routed to designated terminals, 'sinks,' or processing centers." Data transportation was operationally defined for this study by how quickly and in what channel the data are sent to the processing centers. The following scales were used:

How long does it take--on the average--to get this raw data from the field to your office or processing center where it is tabulated and used?

1... More than one year
2... More than six months, less than one year
3... More than three months, less than six months
4... More than one month, less than three months
5... More than one week, less than one month
6... More than one day, less than one week
7... One day or less

How is this data from the field sent to the processing center or office?

1... In person
2... By mail, either inter-office or by the U.S. Post Office
3... By telephone conversation
4... By computer

Data processing is the process by which data are transformed into potential information. According to Thayer, "Whether data or communication system, there are but two kinds of interne elements: processing centers or 'nodes' where something is done to the data received, and the 'links' over which the data are routed or distributed. The kinds of processing which might be carried out by these nodes or processing centers range from simple storage and reproduction to rearrangement, recombination, reduction, amplification and extrapolation, to mechanical analysis or synthesis and mechanical 'decisioning' to packaging and rerouting." Data processing was operationally defined as the degree of sophistication and speed of data manipulation and storage, plus the number of people involved in the process. The following scales were used:

How is the data tabulated or processed in the office?

1... No processing is required. The raw data is used directly by decision-makers as it comes from the field.
2... Manually with paper and pencil
3... By simple machine calculators
4... By computers

What size staff actually processes the data?

1... Less than one fulltime person
2... One fulltime person
3... More than one fulltime person. How many?____ (Actual number for #3 becomes scale value)

From the time raw data from the field is received at the processing center, how long does it take to display it in the final form that decision-makers use?

0... More than 18 months
1... More than one year, less than 18 months
2... More than six months, less than one year
3... More than three months, less than six months
4... More than one month, less than three months
5... More than one week, less than one month
6... More than one day, less than one week
7... One day or less

Data display is the process by which potential information is presented and distributed. According to Thayer, "Wherever data are routed throughout a communication (or data) system to some node or terminal or sink, those data must be displayed in some way. These displays are of the system's basic output. The output of the processing elements or nodes of a communication system must be in some form and pattern and sequence." Data display was operationally defined for the DNR study by the degree of accessability to the data, the sophistication of the presentation, the orientation of primary users, plus the number of people who use the data.

These four basic processes--data acquisition, transportation, processing, and display--are structural variables: they describe patterned activities and social arrangements. A functional component of a task-oriented communication system is its adaptability, a concept used to describe the overall performance of the communication process. The following scales were used:

Are these any restrictions on who within your own organization can have access to this data?

1... Yes
0... No

How is the data displayed the most frequently? (Check one.)

1... It is not changed in format from the way the raw data is received.
2... Handwritten reports
3... Typed or printed reports
4... Graphs or plots

Which of the following groups uses the data the most? (Check one.)

1... Non-management personnel in your organization working on technical problems.
2... Mid-level management in your organization responsible for specific projects.
3... Top management in your organization. Consider "your organization" to include all divisions and subsidiaries, not just your own local office.
4... People outside the organization use the data the most.

How many people inside your organization use the data?

(Actual number of people is scale value.)

Adaptability is the degree to which the communication process adequately adjusts and interfaces with organizational conditions. Thayer uses two terms--both adaptability and compatibility--to describe this function of the communication process. According to Thayer, "Whether intraorganizational or interorganizational, the efficacy of any communication system or subsystem may depend upon its compatibility with other systems to which it becomes linked.. If two organizations want to link one's purchasing function into the other's supply function through their respective automated equipment, that equipment and its associated languages will have to be compatible...Interpersonally, no matter how crucial a message to the receiver, it isn't going to be acquired and consumed by him unless he is equipped physiologicall linguistically, conceptually, and technologically to acquire and consume it." Adaptability was operationally defined by the degree to which an organization's data can be associated with other types of data. The following scales were used:

Which of the following kinds of data do you have that can be easily associated with your water-use data?

(Respondents could choose any number of items. Scale value is sum of items picked.)

Economic indicators
Employment statistics
Production figures
Population
Other, please specify.

Which of the following indicators are associated with your water-use data? (Check all that apply)

(Respondents could choose any number of items. Scale value is sum of items picked.)

Point-source location, such as longitude or latitude
Geographic area, such as a river basin
Networks, such as highways or river systems
Political regions, such as cities, counties
Other, please specify.

## THEORETICAL AND OPERATIONAL RELATIONSHIPS

The theory discussed here is based on the premise that the basic nature of an organization will influence the structure and function of organizational components. The basic proposition is that an organization's through-put is systematically related to the structure and function of the organization's task-oriented communication. Several hypotheses were examined.

On the assumption that people-processing organizations have a more heterogenous task environment and must cope with more contingencies (Thompson, 1967), it was hypothesized that there would be significant differences in the structure and function of the communication processes among the following types of organizations: manufacturers, state and federal bureaucracies, regional planning agencies, voluntary associations, power generators, and city governments. In Thompson's words, "Generally, we would expect the complexity of the structure, the number and variety of units, to reflect the complexity of the environment" (Thompson, 1967: 70).

On the assumption that the long-range perspective of people-processing organizations allows data to be gathered in a relatively slow manner, and because data could be relatively low in reliability due to the organization's lack of immediate involvement with the market place, it was hypothesized that people-processing organizations would have a smaller data acquisition component than object-processing organizations.

On the assumption that the immediacy of the market place would require data to be quickly gathered and sent to decision-makers, it was hypothesized that the transportation component of the communication process within object-processing organizations would be greater than within people-processing organizations.

On the assumption that people-processing organizations are more concerned with long-range outcomes, thereby investing more in the planning and analysis phases of decision-making, and thereby spending more on sophisticated data manipulation and storage, and probably involving more people in the processing of the data, it was hypothesized that people-processing organizations would have a greater data processing component than would object-processing organizations.

In support of this hypothesis is the notion that because people-processing organizations must interact with the "human variable", they must therefore be more capable of exercising appropriate coordination for the through-put; in other words, it was assumed that people-processing systems would be more sophisticated in processing information--or, to use Thompson's terminology, they would more likely have "coordination by mutual adjustment"--compared to object-processing organizations which, in Thompson's framework, would be described as achieving coordination more by standardization and plan.

On the assumption that people-processing organizations must attract and motivate those being processed, and therefore would invest more in disseminating and presenting data in appropriate, flexible ways, it was hypothesized that people-processing organizations would have a greater display component in their communication process than would object-processing organizations.

Because people-processing organizations are concerned with relatively complex, long-range plans and would probably invest more in coordinating their own data with other types of data, it was hypothesized that people-processing organizations would have more adaptable communication systems than object-processing organizations. Theoretical support for this hypothesis comes from the proposition that people-processing organizations, essentially a dynamic task environment, will place greater emphasis on coordination by mutual adjustment than will a more stable object-processing organization (Thompson, 1967).

## RESULTS

The scale measuring the reliability of the data acquisition activities and the scale measuring the frequency with which the data were collected were highly correlated ($r=.83$, objects; $r=.66$, people), indicating the data acquisition index is an internally consistent indicator of the structured activity. It was hypothesized that the data acquisition index for people-processing organizations would be less than the data acquisition index for object-processing organizations. Table 1 indicates that the null hypothesis can be rejected ($p<.01$).

The scale measuring the speed with which data are transported to the processing center and the scale measuring the technological sophistication of the data transportation were highly correlated ($r=.58$, objects; $r=.73$, people), indicating high internal consistency for the data transportation index. It was hypothesized that the data transportation index for people-processing organizations would be lower than the data transportation index for object-processing organizations. Table 1 indicates that the null hypothesis could be rejected ($p<.10$). Descriptive statistics for separate scales measuring data transportation indicates that there are significant differences between measures of the speed with which data are transported ($p<.025$); but, there are no significant differences between measures of the data transportation technology.

Three scales were used to build an index of data processing. Correlations between scales were high, indicating a highly internally consistent index. It was hypothesized that the data processing index for people-processing organizations would be greater than the data processing index for object-processing organizations. Table 1 indicates that the null hypothesis cannot be rejected. In fact, it is probably more correct to hypothesize that the data processing index for people-processing organizations will be less than the same index for object-processing organizations ($p<.005$). Analyzing the scales separately indicates no statistically significant difference between the processing staff size of people-processing and object-processing organizations, with large statistically significant differences between measures of processing technology and turnaround time--again, in the opposite direction than hypothesized.

The data display index is not reliable: the correlations between scales used to build the index were mixed (see Table 2 and 3). For example, the degree of display restrictions and the number of people within the organization receiving the data are positively correlated for object-processing organizations. Also, the sophistication of data display and the level of management most often using the data are positively correlated for object-processing organizations. But, these scales are not significantly correlated for people-processing organizations. People-processing organizations expose more people to the data ($p<.025$).

Because no people-processing organization indicated any internal restrictions on their data, and because three of the 14 object-processing organizations did, the differences in means was statistically significant ($p<.001$); but, again, the difference is in the opposite direction than hypothesized.

Correlations between scales measuring the adaptability of the communication systems were not significant (see Table 2 and 3). Therefore, individual scales were analyzed to test the hypothesis that people-processing organizations would have more adaptable communication systems than object-processing organizations. Theoretically, people-processing organizations would be measured higher on both the general and specific adaptability scales than object-processing organizations. Table 1 indicates that the null hypothesis can be rejected for specific indicators of adaptability ($p<.025$). However, the null hypothesis cannot be rejected for general indicators of adaptability.

## CONCLUSIONS

The research findings support the proposition that an organization's through-put will significantly influence the structure and function of the organization's task-oriented communication system. Object-processing organizations in this study scored significantly higher on the data acquisition index than people-processing organizations. Also, the evidence indicates object-processing organizations place much more emphasis on data transportation than people-processing organizations. The importance of object-processing organizations producing a tangible output--a product--cannot be underestimated. Apparently, the immediacy of the marketplace impacts on object-processing organizations making them acquire more reliable data and transport the data faster than organizations which essentially provide people with a service and do not have much contact with a marketplace. In other words, object-processing organizations probably have a quicker adjustment feedback loop than people-processing organizations.

A related finding is that data acquisition and data transportation are highly interdependent (as shown by the high correlations between indices). It could be postulated that as an organization increases data acquisition, it will increase data transportation; or, as data transportation increases, data acquisition will increase. But, there could be some third factor simultaneously influencing both data acquisition and transportation. For instance, the more importance an organization places on getting reliable data, the more likely the organization will invest in getting data from the field to the main office; in other words, the perceived criticalness or importance of the data may influence both data acquisition and transportation.

The theory described in this paper predicts that people-processing organizations would have a greater data processing component than object-processing organizations. The research findings do not support this prediction. In fact, the indices for data processing for both people-processing and object-processing organizations are significantly different in the opposite direction than was predicted ($p<.005$). The reason for this contradiction may be found in the sample selection: organizations, participating in this research had expressed a high interest in data about how water is used--they do not represent all organizations using this type of task-oriented information. For object-processing organizations, there may have been an interaction between their expressed high interest and the level of detail apparently contained in their water-use data. This would account for object-processing organizations requiring more data processing than people-processing organization, which--although they were highly interested in the data--apparently process less detailed data. Again, the relative importance of the data to the organization's survival--the criticalness of the data--may account for the important role in this research that data processing plays for object-processing organizations. Also, the complexity of the data itself--the detail embedded in the data--may interact with the high interest of the object-processing organizations. The research findings reported here support the proposition that object-processing organizations expressing a high interest in a certain type of task-oriented information will have a higher data processing component than will people-processing organizations expressing a similar interest in the same type data. Most likely this relationship is caused by an interaction between the expressed interest or need for the data and the data acquisition/transportation component of the object-processing organizations.

There also seems to be a relationship between data processing turnaround time and data acquisition and transportation(as indicated by the high correlations between measures of these structural variables). It seems appropriate to consider the time element inferred from these measures as an important variable in any theory relating structural activities of task-oriented communication, for time pressures seem to be important factors in both sets of organizations studied here. It could be hypothesized, for instance, that as time pressure increases to make decisions with this type of data, the amount of organizational effort invested in acquiring data frequently, getting that data processed and displayed rapidly to decision-makers will increase.

The research findings about data display indicate that object-processing organizations, which acquire more reliable (detailed) data than people-processing organizations, apparently require more sophisticated display formats ($p<.3$) which require more intense data processing. The importance of the data was reflected in only object-processing organizations placing restrictions on water-use data. People-processing organizations not only do not restrict access to the data, they display data to more people ($p<.025$).

Although organizations involved in this survey were selected for their expressed high interest in this type of data, there nevertheless appears to be a qualitative difference in the importance of the data to the two types of organizations. Object-processing organizations this sample apparently consider water-use data more valuable (requiring restrictions so that only an elite set of organizational decision-makers have access to it) than people-processing organizations. The fact that the majority of the people-processing organizations in this sample are governmental agencies might account for some of the respondents perceiving no restrictions on this type of data (McElreath, 1973). It could be hypothesized that the perceived criticalness of the decisions made with task-oriented information will determine the degree of restrictions placed on access to the data. Support for this hypothesis could be found in common law definitions of trade secrets; for example, to establish the legal existence of a trade secret, corporate lawyers must demonstrate, among other considerations, the extent of measures taken to guard the secrecy of the information, and the ease or difficulty with which the information could be properly secured or duplicated by others (Simon, 1969).

This same underlying dimension of criticalness may account for subtle differences between measures of adaptability. As previously mentioned, the scale means describing the specific adaptability of the data are significantly different for people-processing and object-processing organizations ($p<.05$); but, there were not significantly different for measures of general adaptability. One possible explanation is that people-processing organizations working with this type of task-oriented information are involved in making multiple uses of it; while object-processing organizations (although their data are apparently more critical and more detailed) these object-molding organizations are not greatly concerned with associating their data with other data systems. The research findings support the hypothesis that people-processing organizations will have more adaptable task-oriented communication systems than will object-processing organizations.

The most important conclusion of this research is that the Katz and Kahn distinction between people and object through-puts is theoretically useful. It is important to know that the basic business of an organization--the material it is in the business of transforming--will greatly influence the structure and function of its task-oriented communication. Not only does what or who is being processed through the organization influence the communication system supported by that organization, but also it appears that what is being processed through the communication system itself--the content of the data--interacts with the organization's through-put, and affects the structure of its task-oriented communication system.

This theory of organizational communication has been operationally defined so that it is limited to fairly technical task-oriented information. It would be enlightening to have the dependent variables operationally defined in more general terms and to have the content of the communication be more generalizable; for instance, to apply this theory to major and minor news events as they are processed through a news organization, or to define the content along dimensions of analyzability, comprehensibility, routineness, or the role it plays in decision-making. The decision-making context may be an important factor to include in this theory of task-oriented organizational communication. Its importance can only be suggested by this research in that its presence may account for some of the apparent contradictions. Incorporating measures of organizational decision-making would greatly aid the development of this theory. As Grunig (in press) has discovered: "There is a clear relationship between the decision situation of an organization...and the types of communication procedures an organization utilizes." The decision-making context could be defined in terms of constraints, problem-solving orientation, or other factors such as whether the decisions are involved in the organization's material, operational or knowledge technology. Also, this structural-functional theory could be applied to subsets of people- and object-processing organizations and applied to subsets of task-oriented information. While this theory of organizational communication has operationalized adaptability as a functional measure, other performance measures could be the communication system's adequacy, reliability and compatibility (Thayer, 1968).

Most importantly, this theory can be integrated into the cybernetic theory of organizational communication developed by Hage (1974c). Figure 2 indicates how these findings can be arranged in a cybernetic model to show how people-processing organizations and object-processing organizations differ. Again, the importance of the cybernetic approach is the emphasis on feedback. Future research should focus on how the functional variables are related to the structural variables: who is involved, why, under what circumstances, what messages are sent, and how efficiently is feedback accomplished. Hopefully, this theory has identified some of the factors which need to be considered in answering such questions.

For practicing professionals in the field of organizational communication, the theory should suggest guidelines for structuring task-oriented communication. For example, professionals should expect more restrictions on task-oriented information within object-processing organizations; in fact, they should be prepared to impose restrictions if designated types of information are to be legally considered trade secrets. Professionals with talents for displaying data should expect to be more involved in people-processing organizations. Professionals with technical skills in gathering and processing information should expect to be more involved in object-processing organizations. Specifically, professionals should expect to find object-processing organizations more involved in acquiring, transporting and processing data, and to find people-processing organizations more involved in displaying data and making the data more adaptable. Professionals should recognize that while this theory has been applied to complex organizations, it may have application to a single organization which is composed of several subunits which may be characterized by traits common to a variety of organizations. This theory has also pointed out the usefulness of conceptualizing the communication process as being made up of data acquisition, transportation, processing and display. Obviously, this theory of organizational communication has application to a wide range of systems.

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TABLE 1

Measures of Structural and Functional Components of Task-Oriented Communication Systems: Descriptive Statistics for People-Processing and Object-Processing Organizations

| COMMUNICATION INDEX (1) Scale (range) | Significance Level | THROUGH-PUT People (N=60) mean | stan. dev. | Objects (N=14) mean | stan. dev. |
|---|---|---|---|---|---|
| ACQUISITION (1-200) | p<.01 | 58.50 | 71.23 | 124.05 | 84.17 |
| A-Reliability (1-7) | p<.025 | 3.78 | 2.55 | 5.29 | 2.37 |
| A-Frequency (1-6) | p<.001 | 1.57 | 2.05 | 3.64 | 2.53 |
| TRANSPORTATION (1-200) | p<.10 | 45.00 | 48.65 | 64.29 | 45.22 |
| T-Speed (1-7) | p<.025 | 2.92 | 2.85 | 4.43 | 2.53 |
| T-Technology (1-4) | n.s. | .78 | .85 | 1.00 | .78 |
| PROCESSING (1-300) | p<.005(2) | 75.44 | 78.12 | 126.19 | 60.64 |
| P-Technology (1-4) | p<.005(2) | 1.73 | .97 | 2.43 | .76 |
| P-Staff Size (1-6) | n.s. | 1.28 | 1.55 | 1.21 | .96 |
| P-Turnaround Time (0-7) | p<.005(2) | 3.12 | 2.79 | 5.00 | 2.39 |
| DISPLAY | | | | | |
| D-Format (1-4) | p<.30 | 2.23 | 1.11 | 2.07 | .92 |
| D-Level (1-3) | n.s. | 1.93 | .97 | 1.93 | .83 |
| D-Audience (1-89) | p<.025 | 22.12 | 27.46 | 5.92 | 3.48 |
| D-Restrictions (0-1) | p<.001 | 0.00 | 0.00 | .21 | .43 |
| ADAPTABILITY (1-200) | p<.05 | 36.83 | 16.21 | 29.29 | 12.07 |
| Adt-General (0-5) | p<.30 | 1.68 | 1.19 | 1.50 | .94 |
| Adt-Specific (0-5) | p<.05 | 2.00 | 1.03 | 1.43 | .85 |

(1) Index derived by summing items standardized to a scale of one to 100.
(2) Significant in the opposite direction than hypothesized.

TABLE 2

PEARSON r CORRELATION MATRIX FOR SCALES MEASURING TASK-ORIENTED COMMUNICATION SYSTEMS WITHIN PEOPLE-PROCESSING ORGANIZATIONS

| SCALE (ABBREVIATION) | A | AR | AF | T | TS | TT | P | PT | PSS | PTT | D | DF | DL | DA | DR | Adt | AdtG | AdtS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Index (A) | 1.000 | | | | | | | | | | | | | | | | | |
| A-reliability (AR) | .760 | 1.000 | | | | | | | | | | | | | | | | |
| A-frequency (AF) | .963 | .661 | 1.000 | | | | | | | | | | | | | | | |
| Transportation Index (T) | .642 | .742 | .643 | 1.000 | | | | | | | | | | | | | | |
| T-speed (TS) | .736 | .865 | .704 | .888 | 1.000 | | | | | | | | | | | | | |
| T-technology (TT) | .498 | .693 | .501 | .907 | .971 | 1.000 | | | | | | | | | | | | |
| Processing (P) | .195 | .304 | .825 | .406 | .394 | .335 | 1.000 | | | | | | | | | | | |
| P-technology (PT) | .122 | .195 | .128 | .294 | .261 | .217 | .736 | 1.000 | | | | | | | | | | |
| P-Staff size (PSS) | .197 | .272 | .215 | .352 | .324 | .293 | .736 | .309 | 1.000 | | | | | | | | | |
| P-turnaround time (PTT) | .362 | .527 | .322 | .524 | .579 | .470 | .807 | .605 | .543 | 1.000 | | | | | | | | |
| Display (D) | .106 | .047 | .117 | -.007 | .068 | -.063 | .001 | .066 | .052 | .044 | 1.000 | | | | | | | |
| D-format (DF) | .127 | .120 | .164 | .100 | .124 | .145 | .168 | .074 | .158 | .035 | .610 | 1.000 | | | | | | |
| D-level (DL) | .198 | .226 | .138 | .106 | .151 | .023 | .085 | .106 | .114 | .209 | .514 | -.048 | 1.000 | | | | | |
| D-Audience (DA) | .104 | .030 | .111 | .101 | .016 | .211 | -.181 | .170 | -.201 | -.154 | -.302 | .018 | -.324 | 1.000 | | | | |
| D-restrictions (DR) | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | 1.000 | | | |
| Adaptability (Adt) | -.133 | -.107 | -.113 | -.124 | -.105 | -.137 | .163 | .064 | .252 | -.033 | -.022 | .315 | .083 | -.207 | .000 | 1.000 | | |
| Adt-General (AdtG) | -.116 | -.034 | -.134 | -.072 | -.068 | -.086 | .131 | .161 | .206 | -.071 | -.059 | .289 | .114 | -.225 | .000 | .776 | 1.000 | |
| Adt-Specific (AdtS) | -.077 | -.130 | -.024 | -.113 | -.087 | -.117 | .107 | -.085 | .160 | .030 | .034 | .164 | .000 | -.066 | .000 | .683 | .070 | 1.0 |

TABLE 3

PEARSON r CORRELATION MATRIX FOR SCALES MEASURING TASK-ORIENTED COMMUNICATION SYSTEMS WITHIN OBJECT-PROCESSING ORGANIZATIONS

| SCALE (ABBREVIATION) | A | AR | AF | T | TS | TT | P | PT | PSS | PTT | D | DF | DL | DA | DR | Adt | AdtG | AdtS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acquisition Index (A) | 1.000 | | | | | | | | | | | | | | | | | |
| A-reliability (AR) | .850 | 1.000 | | | | | | | | | | | | | | | | |
| A-frequency (AF) | .993 | .827 | 1.000 | | | | | | | | | | | | | | | |
| Transportation Index(T) | .464 | .689 | .440 | 1.000 | | | | | | | | | | | | | | |
| T-speed (TS) | .746 | .914 | .710 | .771 | 1.000 | | | | | | | | | | | | | |
| T-technology (TT) | .381 | .621 | .388 | .903 | .581 | 1.000 | | | | | | | | | | | | |
| Processing (P) | .279 | .382 | .275 | -.018 | .211 | .120 | 1.000 | | | | | | | | | | | |
| P-technology (PT) | -.001 | .098 | .006 | -.155 | -.063 | .000 | .895 | 1.000 | | | | | | | | | | |
| P-Staff size (PSS) | .248 | .371 | .252 | -.220 | .240 | -.101 | .748 | .569 | 1.000 | | | | | | | | | |
| P-turnaround time (PTT) | .401 | .463 | .382 | .238 | .318 | .329 | .878 | .682 | .430 | 1.000 | | | | | | | | |
| Display (D) | .211 | .185 | .354 | -.175 | .082 | -.346 | .460 | .463 | .623 | .565 | 1.000 | | | | | | | |
| D-format (DF) | .215 | .273 | .178 | .066 | .284 | .000 | .725 | .618 | .498 | .783 | .611 | 1.000 | | | | | | |
| D-level (DL) | .089 | .207 | .024 | .064 | .162 | .000 | .406 | .298 | .306 | .482 | .531 | .311 | 1.000 | | | | | |
| D-Audience (DA) | -.425 | .086 | -.415 | .218 | .062 | .360 | .157 | .221 | .241 | .002 | -.383 | -.019 | .029 | 1.000 | | | | |
| D-restrictions (DR) | -.412 | -.142 | -.423 | -.105 | -.234 | .000 | .109 | .171 | .066 | .076 | .284 | -.042 | .047 | .533 | 1.000 | | | |
| Adaptability (Adt) | -.239 | -.342 | -.261 | -.309 | -.367 | -.325 | .003 | -.048 | -.313 | .214 | .248 | -.065 | .379 | -.219 | .032 | 1.000 | | |
| Adt-General (AdtG) | -.371 | -.484 | -.372 | -.332 | -.452 | -.313 | -.493 | -.541 | -.461 | -.309 | -.030 | -.401 | .049 | -.149 | .096 | .712 | 1.000 | |
| Adt-Specific (AdtS) | .071 | .049 | .041 | .071 | .020 | -.115 | .548 | .529 | .066 | .644 | .385 | .352 | .483 | -.146 | -.061 | .631 | -.096 | 1.000 |

FIGURE I

ORGANIZATIONAL CLASSIFICATION SCHEME

| THROUGH-PUT | |
|---|---|
| PEOPLE | OBJECTS |
| Municipalities (N=18)<br>State and Federal Agencies (N=15)<br>Associations (N=8)<br>Professional Firms (N=8)<br>Regional Planners (N=11) | Manufacturers (N=9)<br>Power Generators (N=5) |
| Total N = 60 | Total N = 14 |

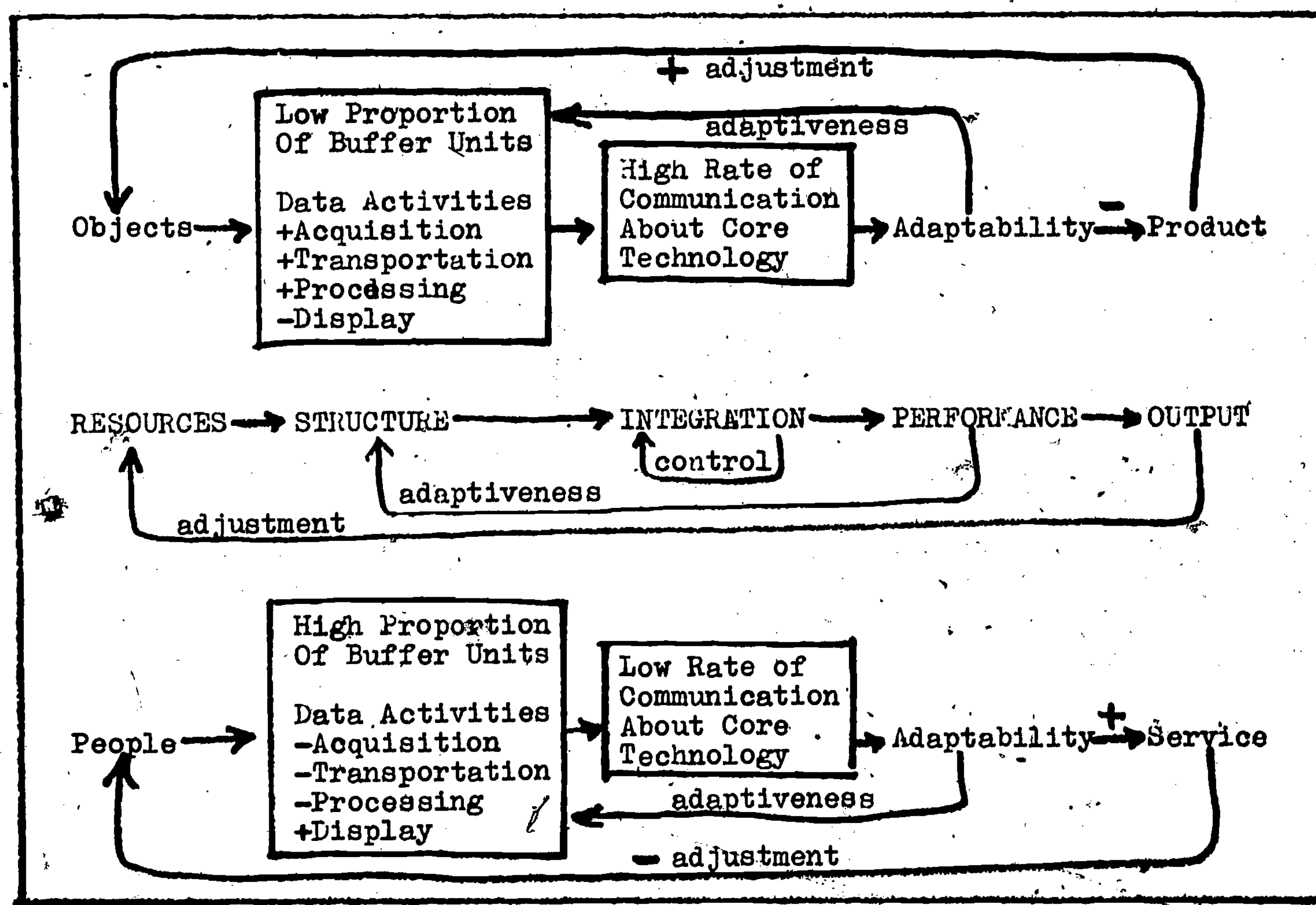


FIGURE 2

COMPARING OBJECT-PROCESSING AND PEOPLE-PROCESSING ORGANIZATIONS ACCORDING TO A CYBERNETIC THEORY OF ORGANIZATIONAL COMMUNICATION